

THE GRAPTOLITE SPECIES *GRAPTOLITHUS NILSSONI*  
BARRANDE, 1850: PROPOSED USE OF THE PLENARY POWERS  
TO DESIGNATE A NEOTYPE. Z.N.(S.) 1934

By D. Palmer (Geology Department, Trinity College, Dublin)

In this application the International Commission is requested to use its plenary powers to designate a neotype for the graptolite species *Neodiversograptus nilssoni* (Barrande, 1850). The purpose of this is to provide stability in a situation where the material basis of this important graptolite species is in doubt. The monograptid in question has been widely recognised in a general way for over a hundred years and the name has been established as that of one of the most characteristic lower Ludlow graptolites. Since the work of Marr (1892), *Monograptus nilssoni* has been known in a more restricted sense as the index species of the graptolite zone of that name.

A short history of the use of the name follows:

1. Barrande (1850, p. 51, plate 2, figs. 16–18) described the graptolite species *Graptolithus nilssoni* and included figures of three specimens with this name, that came from various different stratigraphic horizons. He was not sure of the identity of the specimen represented by fig. 18 and tentatively appended the name *Graptolithus priodon* Bronn. He did not designate a holotype for his new species *G. nilssoni*.

2. Lapworth (1876, p. 315, plate 10, figs. 7a–c) gave a description of *Monograptus nilssoni* (Barrande, 1850) as he understood it and figured two specimens from the "Lower Ludlow Shale", Leintwardine, Herefordshire. He recognised that Barrande (1850) had figured fragments of at least two distinct species under this title and stated that only one (ibid. fig. 16) fitted his (Barrande's) diagnosis.

3. Perner (1899) in his revision of Barrande's original work, also mentioned that only fig. 16 (Barrande, 1850, plate 2) appertains to the typical *M. nilssoni* and reproduced it as his (Perner's, 1899) plate 17, fig. 7. He regarded Barrande's fig. 17 as a proximal fragment of *Cyrtograptus lundgreni* Tullberg, 1883 (reproduced as Perner, 1899, plate 16, fig. 14) and fig. 18 as belonging to a new species, which he called *Cyrtograptus tubuliferus* (Perner, 1899, p. 20, reproduced as plate 17, fig. 4) = *C. hamatus* (Baily, 1862).

4. Bouček (1933, p. 50) in a monographic work on Bohemian cyrtograptids supports Perner's (1899) contention that Barrande's specimen, represented by fig. 17 (Barrande, 1850, plate 2) is referable to *C. lundgreni* Tullberg, 1883, and in this work also regards the specimen of fig. 18 as *C. lundgreni* rather than *C. tubuliferus* (= *C. hamatus*) as suggested by Perner.

5. Bouček (1936) designated what he referred to as the "holotype" (i.e. lectotype) for *M. nilssoni*, as fig. 7 in Lapworth (1876, plate 10). This, however, was invalid because the specimen in question did not form part of Barrande's type-series. He had discovered that even Barrande's fig. 16 (1850, plate 2), which both Lapworth and Perner had regarded as typical of *M. nilssoni*, was a distal fragment of *C. hamatus*, and reiterated his earlier (1933) statement that

the specimens represented by figs. 17 and 18 (Barrande, 1850, plate 2) are referable to cyrtograptid species rather than *M. nilssoni*. The result is that none of Barrande's original specimens (syntypes) corresponds with the common conception of the species that had come to be universally known as *M. nilssoni* (Barrande, 1850), the cosmopolitan index fossil for one of the most widespread Ludlow graptolite zones.

6. Urbanek (1954) observed some distinctive and previously unrecognised characters in well preserved siculae of *Pristiograptus nilssoni* (Auctorum non Barrande, 1850).

7. Urbanek (1958), with new material available, expanded his earlier (1954) description of the species and referred to it as *P. nilssoni* (Lapworth, 1876) after Bouček's invalid lectotype designation (1936).

8. Urbanek (1963) recognised that there were two different forms of "*nilssoni* Auctorum", which he referred to as "A" and "B", and suggested that they belonged to different species. He described a new genus *Neodiversograptus* with *nilssoni* (Lapworth, 1876) *sensu* Urbanek, 1954, (form "A") as the type species and figured (1963, p. 160, text-plate 4) the only specimen he had available, which showed the rhabdosome in the bipolar condition, characteristic of the mature growth stage in the species, and diagnostic of the genus in which it was placed.

9. Urbanek (1966) described a new species *Lobograptus progenitor* to encompass his earlier (1963) "*nilssoni*" form "B".

Several points arising from this historical account are considered below.

(a) Barrande (1850) did not designate a holotype.

(b) Both Lapworth (1876) and Perner (1899) pointed out that of Barrande's syntypes, only one fulfilled his own (Barrande's) diagnosis.

(c) However, since Bouček (1936) discovered that even that one specimen of Barrande's was only superficially and misleadingly like the common conception of *M. nilssoni*, it would cause further confusion if either Lapworth's or Perner's interpretation were to be accepted as a basis for the interpretation of the name.

(d) Bouček's own (1936) designation is not valid in terms of the Code because Lapworth's specimens were not part of Barrande's type-series. Besides he did not specify which of the two specimens figured by Lapworth (1876, plate 10, fig. 7a-c) he was selecting. Furthermore, examination of Lapworth's collection (housed in the Geology Department Museum, University of Birmingham) by the author, has shown that the two specimens figured by Lapworth were on different slabs, one of which has subsequently been lost. The remaining slab has the least satisfactory of the two figured specimens on it, a poorly preserved external mould of a distal fragment, which cannot be specifically identified. Associated proximal fragments on the same slab, which were not figured by Lapworth, are identifiable as *L. progenitor* Urbanek, 1966, rather than *N. nilssoni* as re-described by Urbanek (1963). Thus, this remaining figured specimen (Lapworth, 1876, plate 10, fig. 7a), would be unsatisfactory as a type specimen for *N. nilssoni* in this restricted sense.

(e) Urbanek (1963) following Bouček (1936), had to make a somewhat arbitrary taxonomic decision regarding "*nilssoni sensu lato*", when he named

one of the two forms that he had distinguished, *N. nilssoni* sensu stricto (form "A") and gave the other a new name viz. *L. progenitor* (form "B"). This was somewhat unfortunate since personal examination has shown that all the specimens figured by Lapworth (1876), Wood (1900), also Elles and Wood (1901-1918) (housed in the Geology Department Museum, University of Birmingham), as *M. nilssoni* are referable to the somewhat similar but stratigraphically younger species *L. progenitor* Urbanek, 1966.

(f) A recent study by the author supports the palaeontological correctness of the morphological studies of Urbanek (1954, 1958, 1963 and 1966) and their stratigraphical implications. As defined by Urbanek (1963, 1966) these two species *N. nilssoni* and *L. progenitor*, although similar in some ways, are clearly distinguishable, with palaeontologically significant (from the evolutionary point of view) differences. Their distinction gives a refined zonation of the lower Ludlow strata, which is of considerable biostratigraphical importance, especially since use of the title "*Monograptus nilssoni*" Zone, in the past, can be taken to have included both the *N. nilssoni* and *L. progenitor* Zones of present usage. However, records of "*M. nilssoni*" with an associated graptolite fauna of *Saetograptus colonus* (Barrande), *Monograptus uncinatus* Tullberg and *Spinograptus clathrospinosus* Eisenack, probably refer to *N. nilssoni* as redefined rather than *L. progenitor*.

Under Art. 50 of the Code, the author of the name *Graptolithus nilssoni* is Barrande (1850), since the criteria of availability (Chapter IV of the Code) are satisfied. Under Art. 12 of the Code, the name is available since it was published before 1931 and was accompanied by a description, even though (Art. 17) the figures relate to parts of graptolites belonging to more than one taxon.

When regarded subjectively, Barrande's description could refer to several different taxa but objectively, regardless of palaeontological and stratigraphical usage over the last hundred or more years, only one nominal species is involved. The present application seeks to stabilize the meaning of the name, for both palaeontological and stratigraphical purposes in conformity with that usage and with the morphological description provided by Urbanek (1963). Since it has been shown that all of Barrande's syntypes exist and that they belong to different taxa, none of which comply with subsequent interpretation of the name, it is necessary to ask for the use of the plenary powers in selecting a neotype for the species *M. nilssoni* (Barrande, 1850).

Although in many ways it would be preferable to select as neotype a specimen figured by Urbanek in 1963, there are several disadvantages involved in doing so. The specimens he described are all fragmentary; there is only one specimen of the diversograptid growth stage and this has only part of the  $l^1$ , the sicula and the  $l^2$  preserved; the specimen comes from a Baltic erratic boulder. Consequently it is considered advantageous to select as neotype a specimen from the Ludlow strata of the Long Mountain in the Welsh Borderland. Although the material is flattened and has patchily preserved periderm, the selected specimen (fig. 1, a & b) is a complete diversograptid growth stage with twenty-one thecae on the procladium, a sicula and five thecae forming the sicular cladium. It is preserved on a bedding plane surface with twelve other specimens of the same species. These include ten rhabdosomes at various stages of monograptid

development and two diversograptid growth stages. The locality from which the specimen has come is relatively easily accessible, being in a stream section with almost continuous exposure from middle Wenlock (*C. limmarssoni* Zone) to the *S. leintwardinensis* Zone of the Ludlow. Also it has yielded abundant rhabdosomes of the same species.

The International Commission is therefore asked:

(1) to use its plenary powers

(a) to set aside all type-selections for the nominal species *Graptolithus nilssoni* Barrande, 1850, made prior to the Ruling now asked for and;

(b) having done so, to designate the specimen herein figured (fig. 1, a-b) as neotype of that species. The specimen, registered as TCD 9735 D., is deposited in the Geological Museum of Trinity College, Dublin and was collected from the flaggy, laminated, graptolitic, muddy siltstones of *N. nilssoni* Zone age, in the Long Mountain Siltstone Formation (Palmer, 1969), locality grid ref. SJ 33025/31092, Long Mountain, Montgomeryshire and Shropshire;

(2) to place the following specific name on the Official List of Specific Names in Zoology:- *nilssoni* Barrande, 1850, as published in the binomen *Graptolithus nilssoni*.

#### Description of specimen:

Class	Graptolithina Bronn, 1846
Order	Graptoloidea Lapworth, 1875
Suborder	Monograptina Lapworth, 1880
Family	CYRTOGRAPTIDAE Bouček, 1933
Subfamily	LINOGRAPTINAE Obut, 1957
Genus	<i>Neodiversograptus</i> Urbanek, 1963
Type Species	<i>Neodiversograptus nilssoni</i> (Barrande, 1850)

Generic Diagnosis—see Urbanek (1963, pp. 149–150) and Palmer (in press). A synonymy and description of the species has been given by Urbanek (1963) and elaborated upon by the present author (Palmer in press). Only a brief description of the specimen in question is given here.

*N. nilssoni* is a slender Ludlow graptolite species that during its development attained “on maturity” a bipolar (diversograptid) condition from an initial monograptid stage, by the budding of a single cladium from the sicular aperture.

The length of the sicula is 1.5 mm; the width at the base of the th  $1^1$  is 0.25 mm. and the aperture of the metasacula is 0.5 mm. wide. The total dorso-ventral width of the rhabdosome at the aperture of th  $1^1$  is 0.45 mm. There is a normal monograptid virgella 0.5 mm. long, extending from the ventral side of the sicular aperture, whilst from the dorsal side a stout rod-like structure is developed forming a pseudo-virgula for the sicular cladium and is 8 mm. long.

The rhabdosome is virtually straight with the sicular cladium diverging at an angle of some 25° to the procladial growth axis.

Th  $1^1$  is 1.2 mm. long and at the thecal aperture has a dorso-ventral width of 0.25 mm. The apertural margin is at a slightly oblique angle (20°) to the ventral

thecal wall. The length of the metatheca is poorly defined but appears to be 0.2 mm. in proximal thecae and 0.5 mm. distally. In these distal thecae, the thecal margin has lost its slight obliquity and become more normal to the length of the thecae. By th 15<sup>1</sup>, the length of the thecae has increased to 1.5 mm., with an apertural width (dorso-ventral) of 0.5 mm. The thecal spacing shows virtually no variation at 10 thecae per cm. proximally (measured over 2-3 thecae) and distally. The dorso-ventral width of the rhabdosome at the aperture of the 15<sup>1</sup> is 0.6 mm.

When the flattening of this specimen from the Long Mountain is taken into account, the dimensions of the rhabdosome agree with those defined for *N. nilssoni* by Urbánek (1963) as demonstrated by the author elsewhere (Palmer in press).

This specimen has reached the diversograptid stage of development, as expressed by the growth of the single sicular cladium, with th 1<sup>2</sup> budding from the sicular aperture and a further four thecae budded along the dorsal, apertural, sicular spine, which forms the pseudo-virgula. The dimensions of the thecae of the procladium agree in every respect with those of the distal part of the monograptid stage particularly th 17<sup>1</sup>-21<sup>1</sup>. The details of the development of th 1<sup>2</sup> from the sicular aperture are somewhat obscure as in most flattened specimens of this species but the sicula itself is fairly well defined (fig. 1.b.).

The specimen here described is one of the bipolar rhabdosomes used by the author (Palmer in press) in a discussion of the regularity of development in *N. nilssoni* and it is claimed that the growth of the sicular cladium in general was initiated when the monograptid branch had reached the th 16<sup>1</sup>-17<sup>1</sup> stage, whereafter there was simultaneous, "one for one", thecal budding on both procladium and sicular cladium. There is also, however, evidence that there was, rarely but perhaps significantly, variation of the stage at which the sicular cladium was initiated, with a considerable prolongation of the monograptid growth stage beyond th 15<sup>1</sup>.

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